Section 9.8.  Stairs, Ramps, Handrails and Guards

9.8.1.  Application

9.8.1.1.  General

1) This Section applies to the design and construction of interior and exterior stairs, steps, ramps, handrails and guards.

9.8.1.2.  Stairs, Ramps, Landings, Handrails and Guards in Garages

1) Where stairs, ramps, landings, handrails or guards are installed in garages that serve a single dwelling unit, the garage shall be considered to be part of the dwelling unit and the requirements for stairs, ramps, landings, handrails and guards within dwelling units shall apply.

9.8.1.3.  Exit Stairs, Ramps and Landings

1) Where a stair, ramp or landing forms part of an exit, the appropriate requirements in Sections 9.9. and 9.10. shall also apply.

9.8.1.4.  Escalators and Moving Walkways

1) Escalators and moving walkways shall conform to the appropriate requirements in Part 3.

9.8.2.  Stair Dimensions

9.8.2.1.  Stair Width

1) <Except as provided in Sentence (2),> required exit stairs and public stairs <serving buildings of residential occupancy> shall have a width of not less than 900 mm.

2) <Exit stairs serving a single dwelling unit shall have a width of not less than 860 mm.

3) Required exit stairs and public stairs serving buildings of other than residential occupancy shall have a width of not less than the greater of:

a) 900 mm, or

b) 8 mm per person based on the occupant load limits specified in Table 3.1.17.1.

4) At least one stair between each floor level within a dwelling unit, and exterior stairs serving a single dwelling unit except required exit stairs, shall have a width of not less than 860 mm.

9.8.2.2.  Height over Stairs

1) The clear height over stairs shall be measured vertically, over the clear width of the stair, from a straight line tangent to the tread and landing nosings to the lowest point above. (See A-3.4.3.4. in Appendix A.)

2) <Except as permitted by Sentences (3) and (4), the clear height over stairs shall not be less than 2 050 mm.

3) The clear height over stairs serving a single dwelling unit shall not be less than 1 950 mm.

4) Reserved.

9.8.3.  Stair Configurations

9.8.3.1.  Straight and Curved Runs in Stairs

1) Except as provided in Sentence (2), stairs shall consist of

a) straight-run flights, or

b) curved flights.

2) Stairs within dwelling units shall consist of

a) straight-run flights,

b) curved flights, or

c) straight runs with winders.

3) Only one set of winders described in Sentence (2) shall be permitted between floor levels.

9.8.3.2.  Minimum Number of Risers

1) Except for stairs within a dwelling unit, at least 3 risers shall be provided in interior flights.

9.8.3.3.  Maximum Height of Stairs

1) The vertical height of any flight of stairs shall not exceed 3.7 m.
9.8.4.  Step Dimensions
(See Appendix A.)

9.8.4.1.  Dimensions for Risers
(See A-9.8.4. in Appendix A.)

1)  Except for stairs serving areas only used as service rooms or service spaces, the rise, which is measured as the vertical nosing-to-nosing distance, shall comply with Table 9.8.4.1.

<table>
<thead>
<tr>
<th>Stair Type</th>
<th>All Steps</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td>Private(1)</td>
<td>200</td>
<td>125</td>
</tr>
<tr>
<td>Public(2)</td>
<td>&lt;180&gt;</td>
<td>125</td>
</tr>
</tbody>
</table>

Notes to Table 9.8.4.1.: 
(1)  Private stairs are exterior and interior stairs that serve single dwelling units or that serve garages that serve single dwelling units.
(2)  Public stairs are all stairs not described as service stairs or private stairs.

9.8.4.2.  Dimensions for Rectangular Treads
(See A-9.8.4. in Appendix A.)

1)  Except for stairs serving areas only used as service rooms or service spaces, the run, which is measured as the horizontal nosing-to-nosing distance, and the tread depth of rectangular treads shall comply with Table 9.8.4.2.

<table>
<thead>
<tr>
<th>Stair Type</th>
<th>Rectangular Treads</th>
<th>Tread Depth, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Run, mm</td>
<td>Max.</td>
</tr>
<tr>
<td>Private(1)</td>
<td>355</td>
<td>210</td>
</tr>
<tr>
<td>Public(2)</td>
<td>&lt;No limit&gt;</td>
<td>&lt;280&gt;</td>
</tr>
</tbody>
</table>

Notes to Table 9.8.4.2.: 
(1)  Private stairs are exterior and interior stairs that serve single dwelling units or that serve garages that serve single dwelling units.
(2)  Public stairs are all stairs not described as service stairs or private stairs.

2)  The depth of a rectangular tread shall be not less than its run and not more than its run plus 25 mm.

9.8.4.3.  Dimensions for Angled Treads
(See A-9.8.4. in Appendix A.)

1)  Angled treads in required exit stairs shall conform to the requirements in Article 3.4.6.9.

2)  Except as provided in Article 9.8.4.5., angled treads in other than required exit stairs shall have an average run, which is measured as the horizontal nosing-to-nosing distance, of not less than 200 mm and a minimum run of 150 mm.

3)  The depth of an angled tread shall be not less than its run, measured as the horizontal nosing-to-nosing distance, at any point and not more than its run at any point plus 25 mm.

9.8.4.4.  Uniformity and Tolerances for Risers and Treads

1)  Except as provided in Sentence (2), risers shall be of uniform height in any one flight, with a maximum tolerance of
   a)  5 mm between adjacent treads or landings, and
   b)  10 mm between the tallest and shortest risers in a flight.
2) Except for required exit stairs, where the top or bottom riser in a stair adjoins a sloping finished walking surface, such as a garage floor, driveway or sidewalk, the height of the riser across the stair shall vary by not more than 1 in 12.

3) Treads shall have a uniform run with a maximum tolerance of
   a) <5 mm> between adjacent treads, and
   b) <10 mm> between the deepest and shallowest treads in a flight.

4) Where angled treads or winders are incorporated into a stair, the treads in all sets of angled treads or winders within a flight shall turn in the same direction.

5) The slope of treads shall not exceed <1 in 50>.

9.8.4.5. Winders
(See Appendix A.)

1) Stairs within dwelling units may contain winders provided
   a) the winders turn through an angle of not more than 90°.
   b) individual treads turn through
      i) an angle of 30° with no deviation above or below 30°, or
      ii) an angle of 45° with no deviation above or below 45°.
   c) the run, measured at a point 200 mm from the narrow end, conforms to the run requirements for a private stair in Table 9.8.4.2., and
   d) the run at the narrow end is not less than 150 mm.

2) Where winders are incorporated into a stair, each set shall not turn through more than 90°.

9.8.4.6. Tread <Nosings>
(See Appendix A and <A-9.8.4. in Appendix A>.)

1) <Except as permitted by Sentence (2), the top of the nosings of stair treads shall have a rounded or bevelled edge extending not less than 6 mm and not more than 14 mm measured horizontally from the front of the nosing.

2) If resilient material is used to cover the nosing of a stair tread, the minimum extension of the rounded or bevelled edge required by Sentence (1) is permitted to be reduced to 3 mm.>

9.8.4.7. <Tactile Warning>
1) Stairs shall be provided with tactile warning strips conforming to Article 3.8.3.11., except for
   a) stairs within or serving a dwelling unit,
   b) exit stairs not normally used for access purposes, and
   c) fire escapes.>

9.8.5. Ramps

9.8.5.1. Application
1) This Subsection applies to pedestrian ramps, except ramps in an accessible path of travel.

2) Ramps in an accessible path of travel shall conform to the requirements in Section 3.8.

9.8.5.2. Ramp Width
(See also Article 9.9.3.2.)

1) <as provided in Sentence (2)>, exit ramps and public ramps <serving buildings of residential occupancy> shall have a clear width of not less than <870 mm>.

2) <All ramps serving a single dwelling unit> shall have a width of not less than 860 mm.

3) <Exit ramps and public ramps serving buildings of other than residential occupancy> shall have a clear width of not less than the greater of
   a) 870 mm, or
   b) 8 mm per person based on the occupant load limits specified in Table 3.1.17.1.>
9.8.5.3. Height over Ramps

1) The clear height over ramps shall be not less than 2 050 mm.

9.8.5.4. Slope

1) The slope of ramps shall be not more than
   a) 1 in 10 for exterior ramps,
   b) 1 in 10 for interior ramps serving residential occupancies,
   c) 1 in 6 for mercantile or industrial occupancies, and
   d) 1 in 8 for all other occupancies.

9.8.5.5. Maximum Rise

1) Where the slope of the ramp is greater than 1 in 12, the maximum rise between floors or landings shall be 1 500 mm.

9.8.6. Landings

9.8.6.1. Application

1) This Subsection applies to landings, except landings for ramps in an accessible path of travel.
2) Landings for ramps in an accessible path of travel shall conform to the requirements in Section 3.8.
3) Finished floors, and ground surfaces with a slope not exceeding <1 in 50>, at the top and bottom of stairs or ramps shall be considered as landings.

9.8.6.2. Required Landings

1) Except as provided in Sentences (2) to (4) and Sentences 9.9.6.6.(2), a landing shall be provided
   a) at the top and bottom of each flight of interior and exterior stairs, including stairs in garages,
   b) at the top and bottom of every ramp with a slope greater than 1 in 50,
   c) where a doorway opens onto a stair or ramp,
   d) where a ramp opens onto a stair, and
   e) where a stair opens onto a ramp.

2) Where a door at the top of a stair within a dwelling unit swings away from the stair, no landing is required between the doorway and the stair.

3) A landing may be omitted at the top of an exterior flight serving a secondary entrance to a single dwelling unit provided
   a) the stair does not contain more than 3 risers,
   b) the principal door is a sliding door or swings away from the stair, and
   c) only a storm or screen door, if any, swings over the stair and is equipped with hardware to hold it open.

4) A landing may be omitted at the bottom of an exterior stair or ramp provided there is no obstruction, such as a gate or door, within the lesser of the width of the stair or ramp or
   a) 900 mm for stairs or ramps serving a single dwelling unit, and
   b) 1 100 mm for stairs or ramps not serving a single dwelling unit.

9.8.6.3. Dimensions of Landings
(See Articles 9.9.6.1. and 9.9.6.6. regarding landings in exits.)

1) Except as provided in <Sentences (3) to (6)> , the width and length of landings shall comply with Table 9.8.6.3. (See Appendix A.)
2) <Reserved.>
### Table 9.8.6.3. Dimensions of Landings
Forming part of Sentence 9.8.6.3.(1)

<table>
<thead>
<tr>
<th>Landing Configuration</th>
<th>Minimum Width, mm</th>
<th>Length, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stairs and ramps serving a single <em>dwelling unit</em></td>
<td>Width of stair or ramp</td>
<td>Not less than 860</td>
</tr>
<tr>
<td>In straight-run stair or ramp, or landing turning through less than 30°, within a <em>dwelling unit</em></td>
<td>Width of stair or ramp</td>
<td>Not less than 900</td>
</tr>
<tr>
<td>In straight-run exterior stair or ramp, or exterior landing turning through less than 30°</td>
<td>Width of stair or ramp</td>
<td>(a) Not less than 230 measured at the inside edge of the landing, and (b) Not less than 370 measured 230 mm from inside edge of landing or handrail</td>
</tr>
<tr>
<td>Landing turning through an angle of 30° or more, but less than 90°</td>
<td>Width of stair or ramp measured at right angle to path of travel</td>
<td></td>
</tr>
<tr>
<td>Landing turning through not less than 90°</td>
<td>Width of stair or ramp measured at right angle to path of travel</td>
<td>Not less than width of stair or ramp landing</td>
</tr>
<tr>
<td>Stairs and ramps serving other than single <em>dwelling units</em></td>
<td>In straight-run stair or ramp, or landing turning through less than 30°</td>
<td>Lesser of required width of stair or &lt;clear width&gt; of ramp, or 1 100</td>
</tr>
<tr>
<td>Landing turning through 30° or more</td>
<td>Width of stair or &lt;clear width&gt; of ramp measured at right angle to path of travel</td>
<td>Not less than width of stair or &lt;clear width&gt; of ramp</td>
</tr>
</tbody>
</table>

3) Where stair flights or ramps of different widths adjoin a single landing, the <minimum width> of the landing shall be:
   a) where one or more of the stair or ramp widths do not exceed their respective required widths, not less than the greater required stair or ramp width, or
   b) where all of the widths of the stairs or ramps exceed their respective required widths, not less than the lesser actual stair or ramp width.

4) Where a door swings toward a stair, the full arc of the swing shall be over the landing.

5) <The slope of landings shall not exceed 1 in 50.>

6) Where a doorway or stairway opens onto the side of a ramp, the landing shall extend for a distance of not less than 300 mm on either side of the doorway or stairway, except on a side abutting an end wall.

### 9.8.6.4. Height over Landings
1) <Except as permitted by Sentence (2),> the clear height over landings shall be not less than 2 050 mm.
2) <The clear height over landings within *dwelling unit* shall be not less than 1 950 mm.>

### 9.8.7. Handrails

#### 9.8.7.1. Required Handrails
1) Except as provided in Sentences (2) to (4), handrails shall be <installed on stairs and ramps in accordance with Table 9.8.7.1>
### Table 9.8.7.1.
**Number of Sides of Stair or Ramp Required to Have a Handrail**

Forming part of Sentence 9.8.7.1.(1)

<table>
<thead>
<tr>
<th>Location of Stair or Ramp</th>
<th>Handrails Serving Stairs</th>
<th>Handrails Serving Ramps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stairs &lt; 1 100 mm Wide</td>
<td>Stairs ≥ 1 100 mm Wide</td>
</tr>
<tr>
<td></td>
<td>Straight</td>
<td>Curved</td>
</tr>
<tr>
<td>Within a dwelling unit</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>All other locations(1)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>Straight or Curved</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Notes to Table 9.8.7.1.:
(1) See Sentences 9.8.7.1.(2), (3) and (4) for exceptions.

2) Where a stair or a ramp is required to be at least 2 200 mm wide due to the *occupant load*, a handrail shall be installed such that no position on the stair or ramp is more than 825 mm from a handrail.

3) Handrails are not required for *stairs and ramps serving a single dwelling unit*, where:
   a) interior stairs have not more than 2 risers,
   b) exterior stairs have not more than 3 risers, or
   c) ramps rise not more than 400 mm.

4) Only one handrail is required on exterior stairs having more than 3 risers provided such stairs serve not more than one dwelling unit.

### 9.8.7.2. Continuity of Handrails

(See Appendix A.)

1) Except as provided in Sentence (2), at least one required handrail shall be continuous throughout the length of the stair or ramp, including landings, except where interrupted by:
   a) doorways, or
   b) newel posts at changes in direction.

2) For stairs or ramps serving a single dwelling unit at least one required handrail shall be continuous throughout the length of the stair or ramp, except where interrupted by:
   a) doorways,
   b) landings, or
   c) newel posts at changes in direction.

### 9.8.7.3. Termination of Handrails

1) Handrails shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard.
   (See Appendix A.)

2) Except for stairs and ramps serving only one dwelling unit at least one handrail at the sides of a stair or ramp shall extend horizontally not less than 300 mm beyond the top and bottom of each flight or ramp. (See Appendix A.)

### 9.8.7.4. Height of Handrails

(See Appendix A.)

1) The height of handrails on stairs and ramps shall be measured vertically from the top of the handrail to:
   a) a straight line drawn tangent to the tread nosings of the stair served by the handrail, or
   b) the surface of the ramp, floor or landing served by the handrail.

2) Except as provided in Sentences (3) and (4), the height of handrails on stairs and ramps shall be:
   a) not less than 965 mm; and
   b) not more than 965 mm.

3) Where guards are required, handrails required on landings shall be not more than 1 070 mm in height.

4) Handrails installed in addition to required handrails need not comply with Sentence (2).
9.8.7.5. Ergonomic Design

1) A clearance of not less than 50 mm shall be provided between a handrail and any surface behind it.

2) All handrails shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold, except where the handrail is interrupted by newells at changes in direction. (See Appendix A.)

9.8.7.6. Projections into Stairs and Ramps

1) Handrails and constructions below handrails, including handrail supports and stair stringers, shall not project more than 100 mm into the required width of a stair or ramp. (See also Articles 9.8.2.1. and 9.8.5.2.)

9.8.7.7. Design and Attachment of Handrails

(See Appendix A.)

1) Handrails and any building element that could be used as a handrail shall be designed and attached in such a manner as to resist
   a) a concentrated load at any point of not less than 0.9 kN, and
   b) for handrails other than those serving a single dwelling unit, a uniformly distributed load of 0.7 kN/m.

2) Where a handrail serving a single dwelling unit is attached to wood studs or blocking, the attachment shall be deemed to comply with Sentence (1) where
   a) the attachment points are spaced not more than 1.2 m apart,
   b) the first attachment point at either end is located no more than 300 mm from the end of the handrail, and
   c) the fasteners consist of not less than 2 wood screws at each point, penetrating not less than 32 mm into solid wood.

9.8.8. Guards

9.8.8.1. Required Guards

(See Appendix A.)

1) Except as provided in Sentences (2) and (3), every surface to which access is provided for other than maintenance purposes, including but not limited to flights of steps and ramps, exterior landings, porches, balconies, mezzanines, galleries and raised walkways, shall be protected by a guard on each side that is not protected by a wall for the length where
   a) there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface, or
   b) the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.

2) Guards are not required
   a) at loading docks,
   b) at floor pits in repair garages, or
   c) where access is provided for maintenance purposes only.

3) Where an interior stair has more than 2 risers or an interior ramp rises more than 400 mm, the sides of the stair or ramp and the landing or floor level around the stairwell or ramp shall be protected by a guard on each side that is not protected by a wall.

4) Doors in buildings of residential occupancy, where the finished floor on one side of the door is more than 600 mm above the floor or other constructed surface or ground level on the other side of the door, shall be protected by
   a) a guard, or
   b) a mechanism capable of controlling the free swinging or sliding of the door so as to limit any clear unobstructed opening to not more than 100 mm.

5) Except as provided in Sentence (6), openable windows in buildings of residential occupancy shall be protected by
   a) a guard, or
   b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm.

< (See Appendix A. )>
6) Windows need not be protected in accordance with Sentence (5), where
   a) the window serves a dwelling unit that is not located above another suite,
   b) Reserved.
   c) the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window,
   d) the window sill is located more than 450 mm above the finished floor on one side of the window, or
   e) the window is located in a room or space with the finished floor described in Clause 9.8.8.1.(6)(d) located less than
      1 800 mm above the floor or ground on the other side of the window.

   (See A-9.8.8.1.(5) in Appendix A.)

7) Except as provided in Sentence (8), glazing installed over stairs, ramps and landings that extends to less than
   1 070 mm above the surface of the treads, ramp or landing shall be
   a) protected by guards, in accordance with this Subsection, or
   b) non-openable and designed to withstand the specified lateral loads for balcony guards as provided in
      Article 4.1.5.14.

8) In dwelling units, glazing installed over stairs, ramps and landings that extends to less than 900 mm above the
   surface of the treads, ramp or landing shall be
   a) protected by guards, in accordance with this Subsection, or
   b) non-openable and designed to withstand the specified lateral loads for balcony guards as provided in
      Article 4.1.5.14.

9) Glazing installed in public areas that extends to less than 1 m from the floor and is located above the second
   storey in buildings of residential occupancy shall be
   a) protected by guards in accordance with this Subsection, or
   b) non-openable and designed to withstand the specified lateral loads for balcony guards as provided in
      Article 4.1.5.14.

9.8.8.2. Loads on Guards
(See Appendix A.)

1) Guards shall be designed to resist the specified loads prescribed in Table 9.8.8.2.

| Table 9.8.8.2. Specified Loads for Guards |
| Forming part of Sentence 9.8.8.2.(1) |

<table>
<thead>
<tr>
<th>Location of Guard</th>
<th>Minimum Design Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Horizontal Load Applied Inward or Outward at any Point at the Minimum Required Height of the Guard</td>
</tr>
<tr>
<td>Guards within dwelling units and exterior guards serving not more than 2 dwelling units</td>
<td>0.5 kN/m OR concentrated load of 1.0 kN applied at any point(1)</td>
</tr>
<tr>
<td>Guards serving access walkways to equipment platforms, contiguous stairs and similar areas</td>
<td>Concentrated load of 1.0 kN applied at any point</td>
</tr>
<tr>
<td>All other guards</td>
<td>0.75 kN/m OR concentrated load of 1.0 kN applied at any point(1)</td>
</tr>
</tbody>
</table>

Notes to Table 9.8.8.2.:
(1) The load that creates the most critical condition shall apply.
(2) See Sentence (2).
2) Where the width and spacing of balusters in guards within dwelling units and in exterior guards serving not more than 2 dwelling units is such that 3 balusters can be engaged by a load imposed over a 300 mm width, the load shall be imposed so as to engage 3 balusters.

3) None of the loads specified in Table 9.8.8.2. need be considered to act simultaneously.

4) For guards within dwelling units and for exterior guards serving not more than 2 dwelling units, Table 9.8.8.2. need not apply where the guard construction used has been demonstrated to provide effective performance.

9.8.8.3. Height of Guards
(See Appendix A.)

1) Except as provided in Sentences (2) to (4), all guards shall be not less than 1 070 mm high.

2) All guards within dwelling units shall be not less than 900 mm high.

3) Exterior guards serving not more than one dwelling unit shall be not less than 900 mm high where the walking surface served by the guard is not more than 1 800 mm above the finished ground level.

4) Guards for flights of steps, except in required exit stairs, shall be not less than 900 mm high.

5) The height of guards for flights of steps shall be measured vertically from the top of the guard to a line drawn through the leading edge of the treads served by the guard.

9.8.8.4. Guards for Floors and Ramps in Garages

1) Except for floors of garages referred to in Section 9.35, where garage floors or ramps are 600 mm or more above the adjacent ground or floor level, every opening through a garage floor and the perimeter of floors and ramps that have no exterior walls shall be provided with
   a) a continuous curb not less than 150 mm in height, and
   b) a guard not less than 1 070 mm above the floor level.

2) Vehicle guardrails shall be designed for a concentrated horizontal load of 22 kN applied outward at any point 500 mm above the floor surface. (See A-4.1.5.14. and 4.1.5.15.(1) in Appendix A.)

9.8.8.5. Openings in Guards

1) Except as provided in Sentence (2), openings through any guard that is required by Article 9.8.8.1. shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard. (See A-9.8.8.5.(1) and (2) in Appendix A.)

2) Openings through any guard that is required by Article 9.8.8.1. and that is installed in a building of industrial occupancy shall be of a size that will prevent the passage of a spherical object having a diameter of 200 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard. (See A-9.8.8.5.(1) and (2) in Appendix A.)

3) Unless it can be shown that the location and size of openings that do not comply with the following limits do not represent a hazard, openings through any guard that is not required by Article 9.8.8.1. and that serves a building of other than industrial occupancy, shall be of a size that:
   a) will prevent the passage of a spherical object having a diameter of 100 mm, or
   b) will permit the passage of a spherical object having a diameter of 200 mm.
(See Appendix A.)

9.8.8.6. Design <of Guards to Not Facilitate> Climbing

1) Guards required by Article 9.8.8.1., except those in industrial occupancies and where it can be shown that the location and size of openings do not present a hazard, shall be designed so that no member, attachment or opening facilitates climbing.

2) Guards shall be deemed to comply with Sentence (1) where all elements protruding from the vertical and located within the area between 140 mm and 900 mm above the floor or walking surface protected by the guard conform to at least one of the following Clauses:
   a) they are located more than 450 mm horizontally and vertically from each other,
   b) they provide not more than 15 mm horizontal offset,
   c) they do not provide a toe-space more than 45 mm horizontally and 20 mm vertically, or
   d) they present more than a 2-in-1 slope on the offset.
(See Appendix A.)
9.8.8.7. Glass in Guards
1) Glass in guards shall be
   a) safety glass of the laminated or tempered type conforming to CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass.” or
   b) wired glass conforming to CAN/CGSB-12.11-M, “Wired Safety Glass.”

9.8.9. Construction
9.8.9.1. Loads on Stairs and Ramps
1) Except as specified in Articles 9.8.9.4. and 9.8.9.5., stairs and ramps shall be designed for strength and rigidity under uniform loading criteria to support specified loads of
   a) 1.9 kPa for stairs and ramps serving not more than one dwelling unit and
   b) 4.8 kPa for other stairs and ramps.

9.8.9.2. Exterior Concrete Stairs
1) Exterior concrete stairs with more than 2 risers and 2 treads shall be
   a) supported on unit masonry or concrete walls or piers not less than 150 mm in cross section, or
   b) cantilevered from the main foundation wall.

2) Stairs described in Sentence (1), when cantilevered from the foundation wall, shall be constructed and installed in conformance with Subsection 9.8.10.

3) The depth below ground level for foundations for exterior steps shall conform to the requirements in Section 9.12.

9.8.9.3. Exterior Wood Steps
1) Exterior wood steps shall not be in direct contact with the ground unless suitably treated with a wood preservative.

9.8.9.4. Wooden Stair Stringers
1) Wooden stair stringers shall
   a) have a minimum effective depth of 90 mm, measured perpendicularly to the bottom of the stringer at the point of minimum cross-section, and an overall depth of not less than 235 mm,
   b) be supported and secured top and bottom,
   c) be not less than 25 mm actual thickness if supported along their length and 38 mm actual thickness if unsupported along their length, and
   d) except as permitted in Sentence (2), be spaced not more than 900 mm o.c. in stairs serving not more than one dwelling unit and 600 mm o.c. in other stairs.

2) For stairs serving not more than one dwelling unit where risers support the front portion of the tread, the space between stringers shall be not more than 1 200 mm.

9.8.9.5. Treads
1) Stair treads of lumber, plywood or C-2 grade OSB within dwelling units shall be not less than 25 mm actual thickness, except that if open risers are used and the distance between stringers exceeds 750 mm, the treads shall be not less than 38 mm actual thickness.

2) Stair treads of plywood or OSB that are not continuously supported by the riser shall have their face grain or direction of face orientation at right angles to the stringers.

9.8.9.6. Finish for Treads and Landings
1) The finish for treads and landings of interior stairs in dwelling units, other than stairs to unfinished basements, shall consist of hardwood, vertical grain softwood, resilient flooring or other material providing equivalent performance.

2) Treads and landings of interior and exterior stairs and ramps, other than those within dwelling units, shall have a slip-resistant finish or be provided with slip-resistant strips that extend not more than 1 mm above the surface.
9.8.10. Cantilevered Precast Concrete Steps

9.8.10.1. Design

1) Exterior concrete steps and their anchorage system that are cantilevered from a foundation wall shall be designed and installed to support the loads to which they may be subjected.

9.8.10.2. Anchorage

1) Cantilevered concrete steps referred to in Article 9.8.10.1. shall be anchored to concrete foundation walls not less than 200 mm thick.

9.8.10.3. Prevention of Damage Due to Frost

1) Suitable precautions shall be taken during backfilling and grading operations to ensure that subsequent freezing of the soil will not cause uplift forces on the underside of cantilevered concrete steps to the extent that the steps or the walls to which they are attached will be damaged.

Section 9.9. Means of Egress

9.9.1. General

9.9.1.1. Application

1) Stairways, handrails and guards in a means of egress shall conform to the requirements in Section 9.8. as well as to the requirements in this Section.

9.9.1.2. Fire Protection

1) In addition to the fire protection requirements provided in Subsection 9.9.4., flame-spread ratings, fire-resistance ratings and fire-protection ratings for means of egress shall conform to Section 9.10.

9.9.1.3. Occupant Load

1) Except for dwelling units, the occupant load of a floor area or part of a floor area shall be the number of persons for which such areas are designed, but not fewer than that determined from Table 3.1.17.1., unless it can be shown that the area will be occupied by fewer persons.

2) The occupant load for dwelling units shall be based on 2 persons per bedroom or sleeping area.

9.9.2. Types and Purpose of Exits

9.9.2.1. Types of Exits

1) Except as otherwise provided in this Section, an exit from any floor area shall be one of the following used singly or in combination:
   a) an exterior doorway,
   b) an exterior passageway,
   c) an exterior ramp,
   d) an exterior stairway,
   e) a fire escape,
   f) a horizontal exit,
   g) an interior passageway,
   h) an interior ramp, or
   i) an interior stairway.

2) Fire escapes shall only be used as exits on existing buildings and shall be designed and installed in conformance with Subsection 3.4.7.

3) Where a horizontal exit is used, it shall conform to Sentence 3.4.1.6.(1) and Article 3.4.6.10.

9.9.2.2. Purpose of Exits

1) An exit shall be designed for no purpose other than for exiting except that an exit may also serve as an access to a floor area.
9.9.2.3. Elevators, Slide Escapes and Windows as Means of Egress

1) Elevators, slide escapes and windows shall not be considered as part of a required means of egress.

9.9.2.4. Principal Entrances

1) Except for doors serving a single dwelling unit, at least one door at every principal entrance to a building providing access from the exterior at ground level shall be designed in accordance with the requirements for exits.

9.9.3. Dimensions of Means of Egress

9.9.3.1. Application

1) This Subsection applies to every means of egress except
   a) exits that serve not more than one dwelling unit, and
   b) access to exits within dwelling units.

9.9.3.2. Exit Width

1) Except for doors and corridors, the width of every exit facility shall be not less than 900 mm. (See Article 9.9.6.3. for doors, Article 9.8.2.1. for stairs, <and Article 9.8.5.2. for ramps.>)

9.9.3.3. Width of Corridors

1) The width of every public corridor, corridor used by the public, and exit corridor shall be not less than 1 100 mm. (See also Subsection 9.9.5. for obstructions in corridors.)

9.9.3.4. Clear Height

1) Except for stairways, doorways and storage garages, the minimum clear height in exits and access to exits shall be 2.1 m. (See Article 9.8.2.2. for stairs, Article 9.8.5.3. for ramps, Article 9.8.6.4. for landings and Article 9.9.6.2. for doorways.)

2) The clear height in exits and access to exits in storage garages shall be not less than 2 m.

9.9.4. Fire Protection of Exits

9.9.4.1. Application

1) Except as provided in Articles 9.9.4.4. < and 9.9.4.6.>, this Subsection applies to the fire protection of all exits except exits serving not more than one dwelling unit.

9.9.4.2. Fire Separations for Exits

1) Except as provided in Sentences (2) and (5) and Article 9.9.8.5., every exit other than an exterior doorway shall be separated from each adjacent floor area or from another exit
   a) <where there is a floor assembly above the floor area,> by a fire separation having a fire-resistance rating not less than that required for the floor assembly above the floor area (see Article 9.10.9.10.), and
   b) <where there is no floor assembly above the floor area, by a fire separation having a fire-resistance rating not less than the greater of>
      i) that required by Subsection 9.10.8. for the floor assembly below, or
      ii) <45 min.>

2) <Reserved>

3) A fire separation common to 2 exits shall be smoke-tight and not be pierced by doorways, duct work, piping or any other opening that may affect the continuity of the separation.

4) A fire separation that separates an exit from the remainder of the building shall have no openings except those for electrical wiring, noncombustible conduit and noncombustible piping that serve only the exit, and for standpipes, sprinkler piping, exit doorways and wired glass and glass block permitted in Article 9.9.4.3.

5) The requirements in Sentence (1) do not apply to an exterior exit passageway provided the passageway has not less than 50% of its exterior sides open to the outdoors and is served by an exit stair at each end of the passageway.

9.9.4.3. Wired Glass or Glass Block

(See A-3.1.8.17.(1) in Appendix A.)

1) This Article applies to wired glass in doors, and wired glass or glass block in sidelights, where these are installed in fire separations between exit enclosures and floor areas.

2) Except as provided in Sentence (3), the combined area of glazing in doors and sidelights shall not exceed 0.8 m².
3) Where an exit enclosure connects with a floor area through an enclosed vestibule or corridor separated from the floor area by fire separations having not less than a 45 min fire-resistance rating, the glazed areas described in Sentence (1) need not be limited as required in Sentence (2).

9.9.4.4. Openings Near Unenclosed <Exterior> Exit Stairs and Ramps

1) <Unprotected openings> in exterior walls of the building shall be protected with wired glass in fixed steel frames or glass block conforming to Articles 9.10.13.5. and 9.10.13.7.> where
   a) an unenclosed exterior exit stair or ramp provides the only means of egress from a suite and is exposed to fire from unprotected openings in the exterior walls of
      i) another fire compartment, or
      ii) another dwelling unit, and>
   b) <unprotected openings> in the exterior walls of the building are within 3 m horizontally and less than 10 m below or less than 5 m above the exit stair or ramp.

9.9.4.5. Openings in Exterior Walls of Exits

1) Either openings in exterior walls of an exit or openings in adjacent exterior walls of the building the exit serves shall be protected with wired glass in fixed steel frames or glass block installed in accordance with Articles 9.10.13.5. and 9.10.13.7., where
   a) the exit enclosure has exterior walls that intersect the exterior walls of the building at an angle of less than 135° measured on the outside of the building, and
   b) the openings in the exterior walls of the building are within 3 m horizontally and less than 2 m above the openings in the exterior walls of the exit.

(See Appendix A.)

9.9.4.6. Openings Near Exit Doors

1) <Where an exterior exit door in one fire compartment is within 3 m horizontally of an unprotected opening in another fire compartment and the exterior walls of these fire compartments intersect at an exterior angle of less than 135°, the opening shall be protected with
   a) wired glass in fixed steel frames conforming to Article 9.10.13.5., or
   b) glass block conforming to Article 9.10.13.7.>

9.9.4.7. Stairways in 2 Storey, Group D or E Buildings

1) Where a suite of Group D or E occupancy is located partly on the first storey and partly on the second storey, stairways serving the second storey of that suite need not be constructed as exit stairs provided,
   a) the building is not greater than 2 storeys in building height,
   b) the suite is separated from other occupancies by at least a 45 min fire separation,
   c) the area occupied by the suite is not greater than 100 m² per storey,
   d) the maximum travel distance from any point in the suite to an exterior exit is not greater than 25 m,
   e) the floor assemblies have a fire-resistance rating of not less than 45 min or are of noncombustible construction, and
   f) the basement and first storey are separated by a fire separation having a fire-resistance rating of not less than 45 min.

9.9.5. Obstructions and Hazards in Means of Egress

9.9.5.1. Application

1) This Subsection applies to obstructions and hazards in every means of egress except those within a dwelling unit or serving not more than one dwelling unit.

9.9.5.2. Occupancies in Corridors

1) Where a corridor contains an occupancy, the occupancy shall not reduce the unobstructed width of the corridor to less than the required width of the corridor.
9.9.5.3. Obstructions in Public Corridors

1) Except as permitted in Sentence (2), obstructions located within 1,980 mm of the floor shall not project horizontally more than 100 mm into exit passageways, corridors used by the public or public corridors in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

2) The horizontal projection of an obstruction referred to in Sentence (1) is permitted to exceed 100 mm where the obstruction extends to less than 680 mm above the floor. (See A-3.3.1.9.(4) in Appendix A.)

9.9.5.4. Obstructions in Exits

1) Except as permitted in Subsection 9.9.6. and Article 9.8.7.6., no fixture, turnstile or construction shall project within the required width of an exit.

9.9.5.5. Obstructions in Means of Egress

1) No obstructions such as posts or turnstiles shall be placed so as to restrict the width of a required means of egress from a floor area or part of a floor area to less than 750 mm unless an alternate unobstructed means of egress is provided adjacent to and plainly visible from the restricted egress.

2) Except as provided in Sentence (3), no obstructions, such as counter gates, that do not meet the requirements for exit doors, shall be placed in a required means of egress from a floor area or part of a floor area unless an alternate unobstructed means of egress is provided adjacent to and plainly visible from the restricted egress.

3) Obstructions, such as counter gates, that do not satisfy Sentence (2), are permitted to be placed in a required means of egress from a part of a floor area in mercantile occupancies and business and personal services occupancies, provided that the part of the floor area served by the obstructed means of egress is not generally accessible to the public.

9.9.5.6. Mirrors or Draperies

1) No mirror shall be placed in or adjacent to any exit so as to confuse the direction of exit, and no mirror or draperies shall be placed on or over exit doors.

9.9.5.7. Fuel-Fired Appliances

1) Fuel-fired appliances shall not be installed in an exit or corridor serving as an access to exit.

9.9.5.8. Service Rooms

1) Service rooms containing equipment subject to possible explosion, such as boilers designed to operate at a pressure in excess of 100 kPa, and certain types of refrigerating and transformer equipment, shall not be located under required exits.

9.9.5.9. Ancillary Rooms

1) Ancillary rooms such as storage rooms, washrooms, toilet rooms, laundry rooms and service rooms shall not open directly into an exit.

9.9.6. Doors in a Means of Egress

9.9.6.1. Obstructions by Doors

1) Except as provided in Sentence (4), obstructions created by doors shall be limited in accordance with Sentences (2) and (3)
   a) at exit doors,
   b) at doors that open into or are located within a public corridor, and
   c) at doors that open into or are located within another facility that provides access to exit from a suite.

2) When fully open, doors described in Sentence (1) shall not decrease the required exit width by more than
   a) 100 mm in exit corridors, and
   b) 50 mm for other exit facilities.

3) The swing of doors described in Sentence (1) shall not reduce the width of the path of travel to less than
   a) the required exit width in exit corridors and passageways, and
   b) 750 mm on exit stairs or landings.

4) Doors serving a single dwelling unit need not comply with Sentences (2) and (3).
9.9.6.2. Clear Opening Height at Doorways

1) Except as provided in Sentences (2) and (3), the clear opening height of doorways shall be not less than 2,030 mm high at
   a) exit doors,
   b) doors that open into or are located within a public corridor, and
   c) doors that open into or are located within another facility that provides access to exit from a suite.

2) The clear opening height under door closers and other devices in doorways described in Sentence (1) shall be not less than 1,980 mm.

3) Doorways serving a single dwelling unit need not comply with Sentences (1) and (2). (See also Article 9.5.5.1.)

9.9.6.3. Clear Opening Width at Doorways

1) Except as provided in Sentence (4), the clear opening width of doorways shall comply with Sentence (2) at
   a) exit doors, and
   b) doors that open into or are located within a public corridor or other facility that provides access to exit from a suite.

2) Doorways described in Sentence (1) shall be
   a) not less than 800 mm wide where there is only one door leaf,
   b) not less than 800 mm wide where multiple-leaf doors are installed with only one active leaf having a latching mechanism described in Article 9.9.6.7., and
   c) not less than 1,210 mm wide where multiple-leaf doors are installed with two active leaves.

3) In doorways described in Sentence (1) that have multiple-leaf doors installed,
   a) no active leaf shall be less than 810 mm wide where only one leaf is active, and
   b) no single leaf shall be less than 610 mm wide where two leaves are active.

4) Doorways serving a single dwelling unit need not comply with Sentence (2). (See also Article 9.5.5.1.)

9.9.6.4. Door Action

1) Except as provided in Sentences (4) and (5), required exit doors and doors in required means of egress, except doors in means of egress within dwelling units, shall swing on the vertical axis.

2) Except as provided in Sentence (5), breakaway sliding doors, installed as required exit doors or required doors in means of egress, shall be identified as swinging doors by means of a label or decal affixed to the door.

3) Revolving doors shall comply with Article 3.4.6.15.

4) Movable partitions used to separate a public corridor from an adjacent business and personal services occupancy or a mercantile occupancy need not conform to Sentence (1), provided the partitions are not located in the only means of egress. (See A-3.3.1.12.(3) in Appendix A.)

5) Exit doors need not conform to Sentences (1) or (2), where
   a) the doors serve accessory buildings where life safety is not adversely affected,
   b) the doors serve storage garages or other accessory buildings serving not more than one dwelling unit, or
   c) the doors
      i) serve storage suites of not more than 20 m² in gross area that are in warehousing buildings of not more than one storey, and
      ii) open directly to the exterior at ground level.

9.9.6.5. Direction of Door Swing

1) Except for doors serving a single dwelling unit exit doors that are required to swing shall swing in the direction of exit travel.

2) Doors that open onto a corridor or other facility that provides access to exit from a room or suite having an occupant load of more than 60 persons shall swing on the vertical axis in the direction of exit travel.

3) Doors that divide a corridor that is not wholly contained within a suite shall swing in the direction of exit travel.

4) Where a pair of doors is installed in a corridor that provides access to exit in both directions, the doors shall
   a) swing in opposite directions, with the door on the right-hand side swinging in the direction of exit travel, or
   b) swing in both directions.